

## **What is claimed is:**

**[Claim 1]** 1. A micro-mirror element comprising:

a micro-mirror substrate formed integral with at least one micro-mirror unit that includes a frame, a moving portion having a mirror portion, and a torsion bar connecting the frame to the moving portion;

a wiring substrate formed with a wiring pattern; and

an electroconductive spacer for separating the micro-mirror substrate from the wiring substrate and for electrically connecting the frame to the wiring pattern;

wherein the wiring substrate includes a first surface facing the micro-mirror substrate, the first surface being provided with a detector for detecting a pivot angle of the mirror portion.

**[Claim 2]** 2. The micro-mirror element according to claim 1, wherein the micro-mirror substrate is formed integral with a plurality of micro-mirror units each of which includes a frame, a moving portion having a mirror portion, and a torsion bar connecting the frame to the moving portion, and

wherein the first surface of the wiring substrate is provided with a plurality of detectors corresponding to the plurality of micro-mirror units, respectively, each detector detecting a pivot angle of the mirror portion in a corresponding one of the micro-mirror units.

**[Claim 3]** 3. The micro-mirror element according to claim 1, wherein the detector comprises an optical sensor.

**[Claim 4]** 4. The micro-mirror element according to claim 1, wherein the detector comprises a capacitance-type sensor.

**[Claim 5]** 5. The micro-mirror element according to claim 1, wherein the wiring substrate includes a second surface opposite to the first surface, the wiring pattern including a first wiring portion on the first surface and a second wiring portion on the second surface, the wiring substrate being formed with tie connectors penetrating the wiring substrate in the thickness direction for connecting the first wiring portion and the second wiring portion to each other.

**[Claim 6]** 6. The micro-mirror element according to claim 5, wherein the tie connectors are made of an electroconductive material selected from a group of metals, semiconductors and electroconductive organic materials.

**[Claim 7]** 7. The micro-mirror element according to claim 5, wherein the tie connectors are made by one of plating, CVD, LPCVD and MOCVD.

**[Claim 8]** 8. The micro-mirror element according to claim 1, wherein the spacer comprises at least one electroconductive bump.

**[Claim 9]** 9. The micro-mirror element according to claim 1, wherein the electroconductive spacer is connected to at least one of the wiring pattern and the frame via an electrode pad.

**[Claim 10]** 10. The micro-mirror element according to claim 1, wherein the electroconductive spacer is connected to at least one of the wiring pattern and the frame via an electroconductive adhesive.